

Reaction Wheel with Embedded MEMS IMU, Phase I

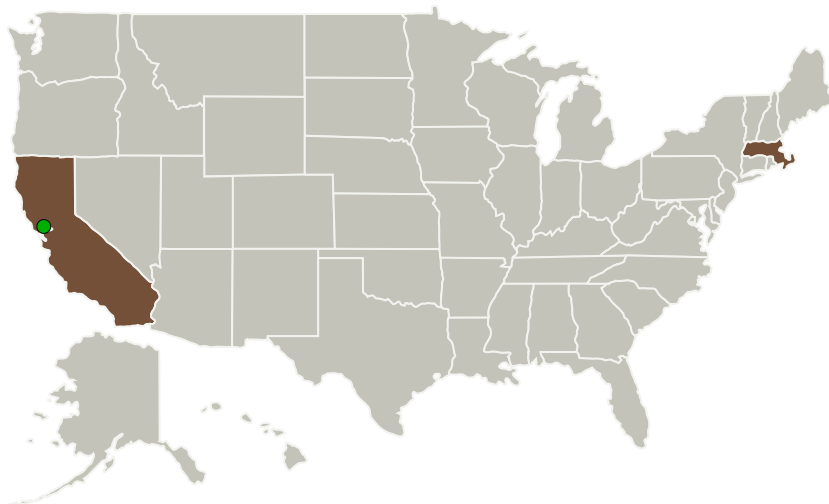
Completed Technology Project (2010 - 2010)



Project Introduction

The innovation is to embed a MEMS IMU Sensor Chip into a reaction wheel to measure its spin rate as well as wheel attitude rate. We propose to use a reaction wheel such as the NASA Goddard reaction/momentum wheel (SMEX) because of its high degree of development and capability for static and dynamic balancing. The IMU Sensor Chip will derive stability from the inertia of the wheel resulting in greater precision and accuracy. During Phase I we propose to integrate the two entities and test the operation of the MEMS gyroscopes and accelerometers of the IMU Sensor Chip to demonstrate the benefits of the union. In addition to attitude sense and control, the combination would also improve GN&C and enable autonomous operation in GPS-denied environments.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Milli Sensor Systems and Actuators, Inc.	Lead Organization	Industry	West Newton, Massachusetts
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California



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Primary U.S. Work Locations

California

Massachusetts

Project Transitions

 **January 2010:** Project Start

 **July 2010:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140043>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Milli Sensor Systems and Actuators, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

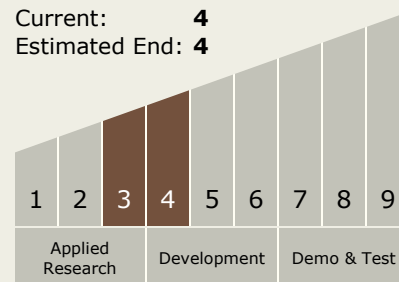
Donato (dan) Cardarelli

Technology Maturity (TRL)

Start: **3**

Current: **4**

Estimated End: **4**



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Technology Areas

Primary:

- TX10 Autonomous Systems
 - └ TX10.2 Reasoning and Acting
 - └ TX10.2.6 Fault Response

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System